Active Flow Control with Adaptive Design Techniques for Improved Aircraft Safety, Phase I

Completed Technology Project (2006 - 2007)

Project Introduction

The increased aircraft safety potential of active flow control using synthetic jets - specifically, using synthetic jets on the leading edge of the wing to delay flow separation - is of critical importance. Delaying flow separation could allow an aircraft to recover from adverse conditions that would otherwise result in a loss of control. Active flow control using synthetic jet actuators has been the subject of significant research in recent years due to its immense potential to expand the operating regimes of unconventional airfoils and provide "virtual" shaping. Barron Associates (BAI) and its research partners at the University of Virginia and the University of Wyoming propose innovative active flow control solutions that will allow achieve virtual sur-face shaping objectives and delay flow separation at high angles of attack to provide a safer and more efficient flight environment. The proposed integrated actuation and control systems will be demonstrated using a Boeing 747 flight simulation. In Phase II, the team will: (1) implement the control algorithms in real time in hardware; (2) fabricate a Boeing 747-like scale model with integrated synthetic jet actuators, and; (3) demonstrate the actuation capacity and control algorithm performance for achieving desired flow control objectives.

Primary U.S. Work Locations and Key Partners

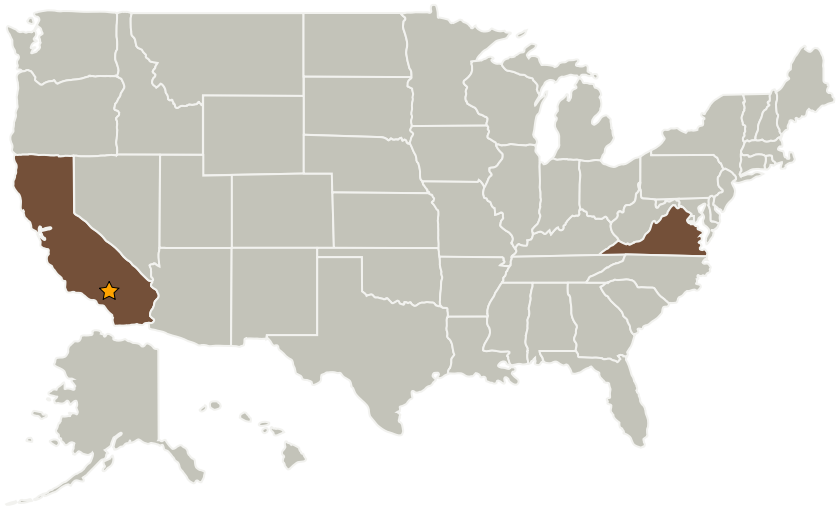

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Barron Associates, Inc.	Supporting Organization	Industry	Charlottesville, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions